

**TECHNICAL RESCUE ASSESSMENT
OF THE
FULL TIME FIRE DEPARTMENTS
IN THE STATE OF RHODE ISLAND**

STRATEGIC MANAGEMENT OF CHANGE

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ABSTRACT

The growing potential for technical rescue incidents prompted the North Providence Fire Department to begin in 1991 purchasing equipment and training personnel for these types of emergencies. The problem that prompted this research was a 1998 evaluation of the department which revealed that it continued to operate at an awareness level despite its efforts to increase its capabilities in the technical rescue field.

The purpose of this research is to evaluate the existing technical rescue capabilities of the 20 full time fire departments in the State of Rhode Island. This information will be used to determine which departments hold equipment and resources available to assist the North Providence Fire Department in mitigating technical rescue emergencies that are beyond their present capabilities. These findings furnished information that will be used to formulate recommendations for compiling a list of external resources and establishing technical rescue mutual aid alliances to obtain these resources. The evaluative research method was used. Listed below are the research questions answered:

1. Are there any fire departments that can assist the North Providence Fire Department with technical rescue equipment?
2. Are there any fire departments that can function at the operations or technician level?
3. Besides the current day to day mutual aid plan, what other response systems can be considered to supply resources in a technical rescue emergency?
4. What governmental agencies located in the state can supply additional rescue resources?

The literature review located the national standards which relate to the general needs of technical rescue operations. This review also included findings on equipment and training requirements. A survey was completed to identify which of the polled communities possess the types of equipment

and personnel needed to supplement the North Providence Fire Department's current capabilities. Comparisons were made between the various departments concerning training, available equipment, and level of operational capability.

This research has shown that only two of the 20 departments surveyed have the capabilities needed to provide the North Providence Fire Department with assistance at a large scale technical rescue incident. The remaining departments are able to supply a limited amount of equipment and personnel dependent on the type of incident. Recommendations include interim measures that would provide training and a rapid recall list to provide proper staffing for technical rescue emergencies. In addition, long term measures to improve the North Providence Fire Department's capabilities and mutual aid agreements were proposed.

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INTRODUCTION

Today fire and rescue departments are the agencies primarily responsible for mitigating technical rescue incidents. The forces of nature such as hurricanes, floods, tornadoes and earthquakes often require technical rescues in their aftermath. Acts of terrorism, weapons of mass destruction (WMD), and man made disasters are a real threat and present a need for technical rescue operations. Many of these emergencies may involve swift water currents, confined spaces, structural collapses, trench cave-ins, high and low angle rope rescues, and hazardous materials (Haz-Mat). These are just a few examples of the complex calls that demand departments to have a greater degree of technical training, special equipment, and enhanced capabilities.

Technical rescue emergencies by nature are more complicated than the daily fire and Emergency Medical Service (EMS) responses. “These incidents often require specially trained personnel and special equipment to complete the mission. The safety of crews conducting technical rescue operations is of special concern.” (USFA, 1995, p. i). Despite this, many departments still are not trained or fully equipped to resolve these incidents without outside assistance.

The need for training in urban search and rescue, or heavy rescue, became apparent on the West Coast after the 1989 San Francisco Loma Prieta Earthquake. Since this event, the Federal Emergency Management Agency (FEMA) has sanctioned 25 disaster teams (Urban Search and Rescue Task Forces) throughout the United States, eight of which are in California. The techniques used during a building collapse, trench rescue, or a technical rope operation are physically and mentally demanding and highly specialized. (Brown, 1997, p.132).

The North Providence Fire Department (NPFDD) responds to between five and six thousand fire and EMS incidents a year. Although the frequency has been low for technical rescues, “almost every jurisdiction is subject to some type risk, such as a major transportation accident or construction collapse, that would necessitate technical rescue expertise” (USFA, 1995, p. 3-2). Like so many other departments across the country, the NPFDD is faced with the problem of how to efficiently and effectively answer their community’s service needs in case of a technical rescue incident.

The problem that initiated this research was that a 1998 assessment of the NPFDD revealed that the department could only operate safely and effectively at the awareness level, based on current NFPA Standards. The lack of training and specialized equipment would make it dangerous for this department to operate at a higher operational level. (Lane 1998, p. 23).

In addition, this assessment indicated that the NPFDD was taking steps to increase their capability level and acquire a limited amount of technical rescue equipment. Nonetheless, these improvements do not diminish the fact that the more complicated rescue incidents would require immediate assistance from outside agencies with specialized technical resources.

The purpose of this research is to determine which full time fire departments in the State of Rhode Island could augment the NPFDD with equipment, expertise and operational capabilities when dealing with technical rescue situations that exceed their current level. The evaluative research method was used. Below is a list of research questions to be answered.

1. Are there any fire departments that can assist the North Providence Fire Department with technical rescue equipment?
2. Are there any fire departments that can function at the operations or technician level?

3. Besides the current day-to-day mutual aid plan, what other response systems can be considered to supply resources in a technical rescue emergency?
4. What governmental agencies located in the state can supply additional rescue resources?

BACKGROUND AND SIGNIFICANCE

State of Rhode Island

Rhode Island is the smallest state in the United States with an area of 1,545 square miles. The U.S. Bureau of the Census estimates the state's population to be 988,480 ranking it 43rd among the 50 states and second in density with 960.3 persons per square mile of land area. The state is divided up into 39 cities and towns as shown in Appendix A. (RIEDC, 1998, p. 3). These communities are protected by 81 different fire departments. The major metropolitan areas and most of the suburbs are protected by full service fire and rescue departments staffed by paid personnel. The rest of the suburban areas and the rural communities are serviced by combination departments, or volunteer departments divided up into fire districts (USFA, 1998, p. 126).

North Providence Fire Department

The Town of North Providence (Town) is centrally located to the north of the Providence metropolitan area, and borders on several other suburban communities. It covers an area of 5.8 square miles and has an estimated resident population of 30,932. This community is the smallest town in the state, but has primary highways providing easy access from any point in the state (RIEDC, 1998, p. 5).

The Town consists of numerous single-family homes along with clusters of multi-family row houses, apartment complexes and housing for elderly residents. Some light industry, shopping centers, churches, schools, a hospital, and a number of old textile mills make up the remainder of the community. The construction types vary from type I to V, and range in age from over one hundred year old

unprotected structures to modern day sprinkled high-rise buildings. In addition, part of the Rhode Island College Campus is located in North Providence.

At present, the NPFDD operates four engine companies, one ladder truck, two advanced life-support rescue companies (ambulances) and one on-duty battalion chief. In addition, one special services unit, one marine unit (boat), and one pump and roll foam unit operate in tandem with other units when needed. The authorized strength of the NPFDD is 102 uniformed personnel. Fire suppression and EMS personnel are assigned to a four platoon-rotating schedule. Shift staffing is 23 members per shift, with a minimum of no less than 20 firefighters on duty at all times.

Technical Rescue Operations

“Fire departments and rescue squads through out the country perform technical rescues on a daily basis” (USFA, 1995, p. i.). Technical rescue is defined as “the application of special knowledge, skills, and equipment to safely resolve unique and/or complex rescue situations” (NFPA 1670, 1999, p. 9).

The primary responder to a technical rescue scene may not always be adequately prepared to perform the rescue operation safely on its own. Additionally the responders may lack the skills and rescue tools necessary to conduct a proper rescue operation. To date, the NPFDD has dealt with some of these complex situations. Each of these incidents was mitigated successfully, however, with the growing possibility of complex rescue scenarios occurring in the Town there is a demand for a greater level of training and acquisition of additional rescue equipment. These are necessary to ensure that each incident is handled effectively and safely for both the victims and the rescuers.

The Town has reduced the funding for NPFDD equipment purchases and training for three of the last four fiscal years. In light of these budget reductions, the funding of the NPFDD is not adequate to

train and equip a technical rescue team. This directly effects the NPFd's ability to perform technical rescue operations in some situations (Lane, 1998, p. 15).

The NPFd has a limited number of personnel trained in all three operational levels for several key rescue disciplines. Overall, the department can only operate at the awareness level, which is the minimum operational level per NFPA standards. Based on the 1998 assessment, it was determined that there are not a sufficient number of trained personnel available on a shift-to-shift basis. For example, a confined space rescue team could not be formed on any of the four shifts. This would necessitate requesting outside assistance to perform this type of technical rescue. (Lane, 1998, p. 23).

This research is part of the applied research requirements for the Strategic Management of Change course at the National Fire Academy (NFA). This research relates to the evaluative phase of the above mentioned course by collecting, examining, and evaluating data to make an assessment of the technical rescue capabilities of the full time fire departments in the state of Rhode Island.

The results of this research will have a significant impact on how the NPFd develops the necessary support systems to augment their technical rescue capabilities in specific rescue areas.

Recent events, such as the World Trade center Bombing and the Oklahoma City Bombing, have created a heightened awareness throughout this country of the need for technical rescue and more specifically, urban search and rescue capabilities. These events, while profound in their impact, tend to overshadow the true need for training and response capabilities in all areas of technical rescue. (DellaRocco, 1998, p. 137).

This research provides facts and recommendations that will assist the Chief of the Department in establishing a rescue response plan. This research may also be helpful to other area fire departments in evaluating their technical rescue emergency plan.

LITERATURE REVIEW

The research procedure began with a literature review conducted at the Learning Resource Center (LRC) on the NFA campus in March 1999. Further reviews were conducted at several local library sites that included North Providence Public Library, North Providence, Rhode Island, and Phillips Memorial Library, Providence College, Providence, Rhode Island between March 1999 and June 1999. In addition, during this period, the author conducted a literature review using a personal collection of fire service periodicals and publications.

National Standards and Recommendations

The literature review located several National Fire Protection Association (NFPA) standards that addressed different areas of technical rescue in the fire service. NFPA Standard Number 1500, 1997 Edition, entitled "*Fire Department Occupational Safety and Health Program*," defines Special Operations in Chapter 1-1-5

Those emergency incidents to which the fire department responds that require specific and advanced training and specialized tools and equipment. Special operations include water rescue, extrication, hazardous materials, confined space entry, high-angle rescue, aircraft rescue and fire fighting and other operations requiring specialized training (NFPA 1500, 1997, p. 8).

NFPA 1670, 1999 Edition, entitled "*Standard on Operations and Training for Technical Rescue Incidents*," 1999 Edition, Chapter 1-1.1 states that "This standard identifies and establishes levels of functional capability for safely and effectively conducting operations at technical rescue incidents." (NFPA 1670, 1999, p. 4). Chapter 1-1.2 goes on to explain that "The requirements of this

standard apply to organizations that provide response to technical rescue incidents.” (NFPA 1670, 1999, p. 4). Chapter 1-2 goes on to say

The purpose of this standard is to assist the authority having jurisdiction (AHJ) in assessing a technical rescue hazard within the response area, to identify the level of operational capability, and to establish operational criteria. The functional capabilities of this standard shall be permitted to be achieved in a variety of ways (NFPA 1670, 1999, p. 4).

Chapter 2-3.1 of NFPA 1670 addresses the use of outside resources stating “The AHJ shall identify the type and availability of external resources needed to augment existing capabilities for technical rescue incidents and shall maintain a list of resources.” (NFPA 1670, 1999, p.11). Furthermore, “The AHJ shall establish procedures for the acquisition of those external resources needed for technical rescue incidents.” (NFPA 1670, 1999, p.11).

NFPA 1600, 1995 Edition, *Recommended Practice for Disaster Management*, Chapter 4.2.6 says that mutual aid agreements. “are an effective means to obtain resources and should be developed whenever possible.” (NFPA 1600, 1995, p. 11). By the NFPA 1600 definition, the term mutual aid agreement includes “Cooperative assistance agreements, intergovernmental compacts, or other commonly used terms for the sharing of resources.” (NFPA 1600, 1995, p. 11).

Two U.S. Fire Administration publications were found that supported the NFPA 1600 recommended practice for the establishment of mutual aid agreements as a means of obtaining technical rescue services. The U.S. Fire Administration’s, *Technical Rescue Technology Assessment*, FA-153, January 1995 states. “Mutual aid agreements allow jurisdictions to help one another and to share rescue resources.” (U.S.F.A., 1995, p. 3-4). The U.S. Fire Administration’s, *Technical Rescue*

Program Development Manual, FA-159, August 1995 discusses the present day need of mutual aid groups to handle technical rescue emergencies. “Multi-agency mutual aid technical rescue teams have been started in many communities across the country.” (U.S.F.A., 1995, p. 10-1).

The recently published Mutual-Aid Plan for Rhode Island, developed by the Rhode Island Association of Fire Chiefs, INC. (RIAFC) provided information relative to mutual-aid agreements in place between departments within the state (RIAFC, 1999).

The Rhode Island National Guard (RING) has published an Emergency Operations Plan (EOP) for the RING called the RI STARC – State Emergency Operations Plan. This plan provided information regarding the roll of the RING in providing emergency assistance (RINGEOP, 1999).

PROCEDURES

The literature review’s first focus was on a search for recognized sources that address the assessment and acquisition of outside rescue resources. This search was intended to identify the nationally accepted standards for technical rescue operations. Secondly, a search was conducted to identify the nationally accepted standards or recommendations for technical rescue equipment and training.

A survey was conducted of the 20 full time fire departments in the state to assess the technical rescue capabilities of these communities. A survey form called “Survey of Technical Rescue Capabilities” (see Appendix B) was developed. Two of the survey questions were based on the findings in the literature review identifying the operational levels and equipment needs.

A number of other questions were asked, including: what operational levels have been attained for specific rescue areas; what types of advanced rescue equipment are currently in service; and whether the department has a technical rescue team developed.

Surveys, along with a cover letter, were handed out or sent to the solicited departments. All surveys were returned having a 90 percent completion rate. The demographics of the surveyed departments is shown in Appendix C.

Data from the survey was entered into Microsoft Excel worksheets and analyzed. These results provided meaningful information relative to the research questions and were used to formulate recommendations.

Battalion Chief John Thomas, Safety Officer, of the Providence Fire Department, was interviewed on July 15, 1999 for specifics about the Providence Fire Department technical rescue program.

Captain Paul Thomas, Company Commander of Special Hazards One (SH-1) heavy rescue unit of the Providence Fire Department, was interviewed on July 15, 1998 for information on the capabilities of the personnel assigned to the unit and the unit's equipment.

Robert Warren, Deputy Chief of the Cranston Fire Department in Cranston, Rhode Island, was interviewed on July 16, 1999 for information on his department's technical rescue capabilities.

Michael DeMoscola, Chief Deputy Fire Marshal in Rhode Island, and a retired Chief of the Providence Fire Department, was interviewed on August 16, 1999 to obtain information on the efforts to train departments in the state for technical rescue.

A phone interview was conducted with Bob Lee, Captain of the La Habra Fire Department in California, and an instructor at NorthNet Fire Academy, on April 13, 1999, in regards to funding, equipping and training a technical rescue team.

In an April 13, 1999 phone interview, Battalion Chief Bruce Jacobson of the NorthNet Fire Training Academy in Anaheim, California, explained the Urban Search and Rescue (USAR) training program and the mutual aid system in the Orange County California area.

Lieutenant Frank Vescera, a company officer with the NFPD, and a member of the FEMA Urban Search and Rescue Team (US&R), Massachusetts Task Force 1 (MATF-1), was interviewed on June 7, 1999 for information on the NFPD'S current capabilities in technical rescue.

Lieutenant Colonel Louis A. Abbenante, a Plans Operations and Military Support Officer for the Rhode Island National Guard, was interviewed on August 6, 1999 regarding the capabilities of the guard.

Albert A. Scappaticci, Operations Officer for the Rhode Island Emergency Management Agency, was interviewed on August 6, 1999 to determine the capabilities of the State of Rhode Island in assistance at major technical rescue incidents.

LIMITATIONS

This research was limited to full time paid departments located in or around the major metropolitan areas of the state. It was assumed that the response time for these departments would fall within the guidelines recommended by NFPA 1670. "The rescue service should have a goal of responding to these emergencies within 15 minutes of the time they receive notification." (NFPA 1670, 1999, p. 22).

This author assumed that the survey responses accurately reflected the department's true technical rescue capability. Further, it was assumed that the respondents understood the qualifications needed to perform at each operational level.

RESULTS

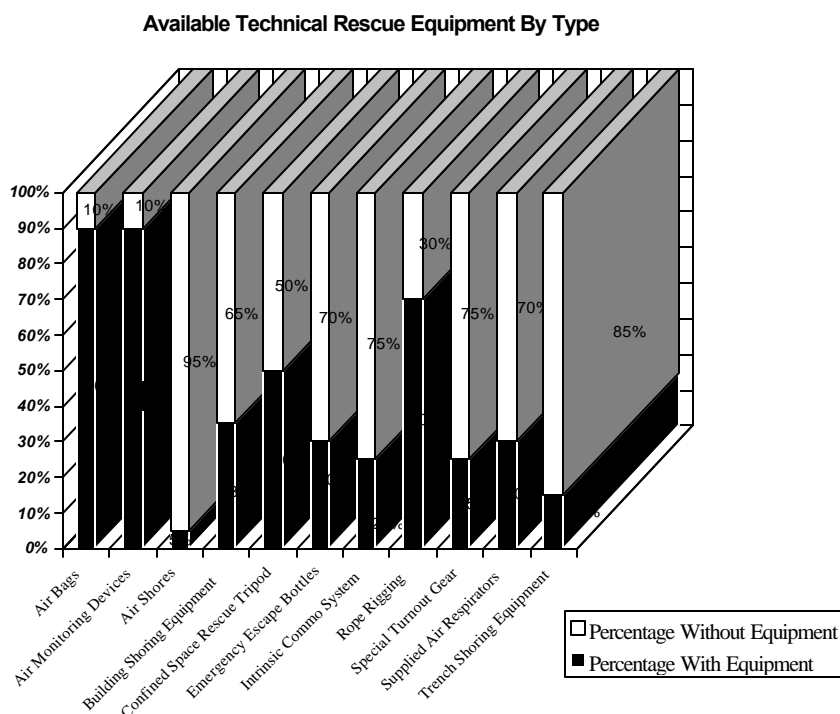
1. Are there any fire departments that can assist the North Providence Fire Department with specialized technical rescue equipment?

This research concentrated on 11 categories of specialty equipment that the NPFD either does not have in service or maintain in a sufficient quantity to be effective. The survey results showed that no one department has all of the surveyed equipment items. Six of the 20 fire departments report that they have at least six of the items listed in the survey. (Refer to Table 1.)

Table 1
Survey of Technical Rescue Equipment
Units in Service

	Air Bags	Air Monitoring Devices	Air Shores	Building Shoring Equipment	Confined Space Rescue Tripod	Emergency Escape Bottles	Intrinsic Commo System	Rope Rigging	Special Turnout Gear	Supplied Air Respirators	Trench Shoring Equipment
Barrington	0	2	0	0	0	0	0	0	0	0	0
Central Falls	0	1	0	0	1	4	0	4	0	4	2
Cranston	4	3	0	1	1	4	0	2	4	1	12
East Providence	10	4	0	0	1	2	5	1	0	2	0
Johnston	3	1	0	0	0	0	0	0	0	0	0
Middletown	4	1	0	1	1	0	0	1	0	0	0
Narragansett	2	1	0	0	0	0	0	0	0	0	0
Newport	8	1	0	0	0	0	0	1	0	0	0
North Kingstown	4	2	0	1	0	0	0	0	0	0	0
North Providence	4	2	0	1	0	0	0	1	0	0	0
Pawtucket	4	0	0	0	0	0	2	1	0	0	0
Portsmouth	5	3	0	1	1	0	3	0	0	0	0
Providence	20	4	5	1	1	0	0	4	4	1	1
Smithfield	12	3	0	0	0	0	0	2	0	0	0
Warwick	12	6	0	25	0	0	1	3	0	0	0
West Warwick	2	1	0	0	1	0	0	2	0	0	0
Woonsocket	5	2	0	0	1	2	0	2	0	2	0
Newport Naval*	4	4	0	0	1	6	1	3	6	2	0
Quonset State Airport*	5	1	0	0	1	2	0	1	48	0	0
TF Green State Airport*	2	0	0	0	0	0	0	0	19	0	0
*Government Agency											
Departments Surveyed	20										
Departments With Equipment	18	18	1	7	10	6	5	14	5	6	3
Percentage With Equipment	90%	90%	5%	35%	50%	30%	25%	70%	25%	30%	15%
Departments Without Equipment	2	2	19	13	10	14	15	6	15	14	17
Percentage Without Equipment	10%	10%	95%	65%	50%	70%	75%	30%	75%	70%	85%

Figure 1



According to the breakdown in Figure 1, air bags and air monitoring equipment are nearly 100 percent (18 out of 20) attainable from all the departments surveyed. (See Table 1.) The survey indicated that 70 percent (14 out of 20) of the departments have at least one rope rigging set in service. Supplied air respirators, emergency escape bottles, and confined space rescue tripods, which are all necessary for confined space rescues, are in service with less than half or 30 percent of the fire departments. Equipment for building shoring was available in 35 percent (7 out of 20) surveyed departments. A major problem area was indicated in trench shoring timber and equipment with only (15%) of the departments having any of this equipment in service. Air shores, which are a valuable tool in any shoring operation requiring speed were in short supply with only one department (5 percent) indicating they had this type of equipment in service. A further breakdown of the number of units of each type of equipment available by department is shown in Table 1.

According to Chapter 8 of FA-159 “Technical rescue capabilities require standard equipment commonly carried on fire apparatus and specialized equipment that is not commonly carried.” (USFA-158, 1996, p. 8-1).

Another common misconception many emergency service managers have is that typical fire and rescue service equipment is suited for technical rescue operations or, as it is sometimes called, the "close enough to work in a pinch" syndrome. The hazard curve paradox can give unprepared teams a false sense of security with regard to equipment (Brown, 1994 p. 43).

Examination of the data in Figure 1 indicates that the availability of some equipment items range from a low of 5 percent (1 out of 20) for air shores to a high of 90 percent (18 out of 20) for air bags. Shortages of some items such as air shores could be handled by substituting timber. Other situations where regular self contained breathing apparatus (SCBA) could not be used, such as confined spaces, would require the use of supplied air respirators and emergency escape bottles. (See Figure 1). This would make it impossible for some departments including NPFD to perform certain rescues without outside help.

The prohibitive cost of rescue technology is one of the reasons why many fire departments are not equipped to deal with complex rescue incidents. Rescue equipment, especially for confined space and collapse incidents, can be very expensive, and the need for it may be very infrequent or may not be obvious. For many departments, the cost of preparing and equipping for a rescue situation that is unlikely to occur is difficult to justify. (USFA, 1995, p.1-16).

2. Are there any fire departments that can function at the operations or technician level?

According to NFPA 1670, technical rescue operational levels include (a) awareness, (b) operations, and (c) technician. Personnel trained at the operations and technician level have already met the requirements of the awareness level. The survey data has shown that with the exception of agricultural rescue all of the surveyed departments have members who are certified to the operations or technician level. (See Figure 2 and Figure 3.) In the operations level, skills range from a high of 75 percent (18 out of 20) for rope rescue to a low of 15 percent (3 out of 20) for swift water and industrial rescue. (See Figure 2.) On a technician level, proficiency levels range from a high of 55 percent (11 out of 20) for rope and confined space rescue to a low of 10 percent (2 out of 20) for swift water and industrial rescue. (See Figure 3.)

Figure 2

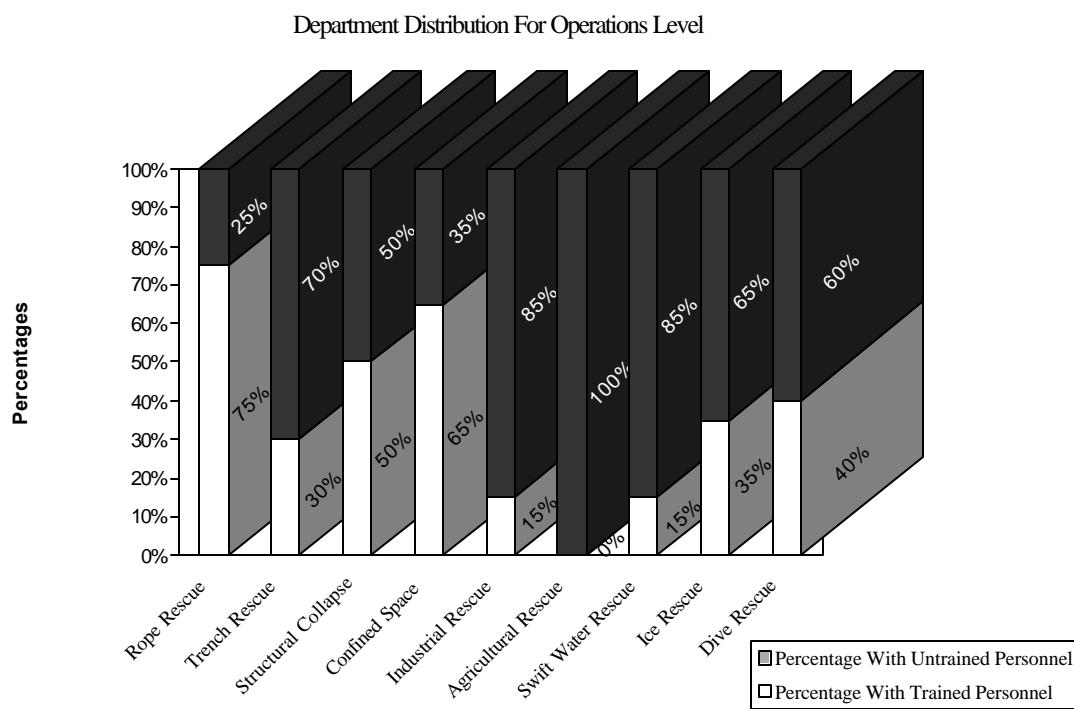
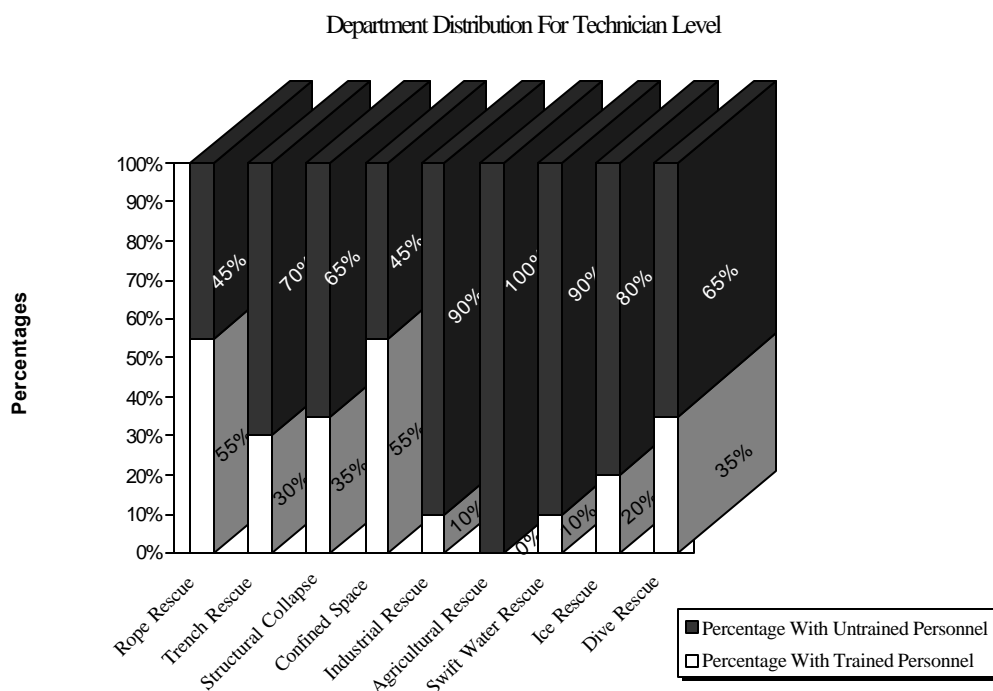


Figure 3



1. Besides the current day-to-day mutual aid plan, what other response systems can be considered to supply resources in a technical rescue emergency?

A review of the Mutual Aid Plan of the RIAFC does not reveal any provisions for technical rescue emergencies (RIFCA, 1999). The plan does list the 11 heavy rescue apparatus, which are available in the state, four of which are operated by the departments surveyed. The plan also provides for a comprehensive distribution of assets throughout the state to deal with any fire or EMS emergencies that may occur in any of the participating communities. This agreement could provide the framework to develop a technical rescue response along regional or county lines. The unique size of the state easily lends itself to a regionalization concept. (See Appendix A.) “The purpose of regional response teams is to equip and train one team that can respond to incidents occurring in any jurisdiction within their region.” (USFA, 1995, p.1-16).

Fifteen of the departments surveyed indicated they would have to rely on mutual aid to assist them in mitigating some technical rescue incidents. The other five departments indicated they had no plan in place for technical rescue assistance.

Mutual aid agreements between political jurisdictions, as well as between private and public sector groups, are an effective means to obtain resources and should be developed whenever possible. Mutual aid agreements should: be in writing; be reviewed by legal council; be signed by a responsible official; define liability; and detail funding and cost arrangements. The term “mutual aid agreement “ as used here includes cooperative assistance agreements, intergovernmental compacts, or other commonly used terms for the sharing of resources (NFPA 1600, 1995, p.11).

There is already an agreement in place with the fire departments located on the Newport Naval Base, T.F. Green Airport, and Quonset Point State Airport. These departments participate in the state mutual aid plan along with the NPFD. The airport departments have apparatus available to respond to “major petroleum fires ...on a secondary response basis” (RI AFC, 1999).

One of the most useful and least thought of resources available to a fire department in a technical rescue incident is private industry. Construction companies and demolition companies are not only rich in equipment but can also be a wealth of knowledge. The skills that a fire department technical rescue team practices are done on a routine daily basis by construction workers. The old axiom “practice makes perfect” truly applies in this instance. The men and women in the construction industry do shoring, blocking and other technical rescue skills daily. They must be considered a prime resource along with mutual aid companies and government agencies as their presence will enhance the probability of a successful mitigation of a technical rescue incident. The fact that they are a for-profit industry allows

them the luxury of being in a position to purchase more and better equipment. Because of the frequency of use, they are more familiar with it and the maneuvers they need to do. There are several construction companies based in the Town, and a large demolition company is located in an adjacent city approximately four miles away.

As far as technical rescue, US&R, and heavy rescue are concerned, heavy equipment is a must, and team members should be aware of what they can contribute to the efficiency and safety of these operations. Knock on the doors of the crane and equipment companies, and persuade them to join your efforts. Then make these resources part of your preplan.

(Shannon, 1999, p. 152.).

2. What governmental agencies located in the state can supply additional rescue resources?

Using a governmental agency as a rescue resource can provide support services, such as transportation, lighting and generators that may help the NPFD to deal with victims and other aspects of the rescue effort (U.S.F.A., 1995, p. 1-17).

In the state of Rhode Island the Rhode Island Emergency Management Agency (RIEMA) is the controlling agency that the NPFD must contact when requesting assistance for a small or large scale incident. The Director of RIEMA coordinates all disaster response activities within the state. This includes getting resources from civil authorities and the Rhode Island National Guard. RIEMA would also coordinate with the Federal Government in the event of a FEMA response request. (RINGEOP, 1999, p. 9). The NPFD must include the RIEMA in their technical rescue response plan for obtaining state or federal rescue resources. They may also assist in obtaining resources from nearby states.

DISCUSSION

When a technical rescue emergency occurs, the public expects the responders to be able to take care of the situation. That is not always the case. Insufficient funding, lack of equipment, and little or no training can be disastrous for the would be rescuers and or the victims. Industry and the public have come to depend on the fire service in almost any situation. There is an implied duty to act, regardless of the NPFDS capabilities. Due to fiscal restraints planning for the big event that may never come is usually not a big priority.

“The Authority Having Jurisdiction (AHJ) shall conduct a hazard analysis and risk assessment of the response area and shall determine the feasibility of conducting technical rescue. Potential hazards and their likelihood of causing an incident shall be identified.” (NFPA 1670, 1999, p.1).

The NPFDS has identified some of the known target hazards in the community. A chemical supply company, numerous jewelry-plating shops, numerous old textile mills, and a large swimming pool supply company all provide the potential for serious HAZ-MAT incidents. Several bodies of water also provide a source for waterborne technical emergencies. A large number of vehicles transport hazardous materials over the main roads and highways of the Town daily. These along with some unknown technical rescue hazards may exist in other locations throughout the community.

The ability of the NPFDS to deal with some of the emergencies that could occur in these locations could quickly become compromised by a lack of resources. Prior research shows that the training and equipment needed to deal with a major incident at some of these complexes is not in place. Although the NPFDS has some personnel trained to the operations and technician level in several technical rescue skills, there are not enough on each shift to form a dedicated team (Lane, 1998, p. 19).

Commitment: Whether it's from the fire chief, department head or mayor, management's support of the rescue program is vital. This support includes the allocation of personnel for the rescue team, as well as the many hours of training and practice drills required for successful rescue operations. The initial training, follow-up training and equipping of a competent rescue team represent a considerable investment in personnel and budgetary funding for any organization or department (Roop, Wright, and Vines, 1997, p. 77).

"Providence, Rhode Island is one of the 120 cities on the list as a potential target for Weapons of Mass Destruction," stated Battalion Chief John Thomas, Safety Officer, of the Providence Fire Department. Chief Thomas concluded "As a result we have received some additional funding to purchase equipment and provide training in the Haz-mat as well as technical rescue field. This will greatly enhance our capabilities in both areas." (Personal communication July 15, 1999).

"We have quite a few people trained for technical rescue, however a lot of them are not assigned to Special Hazards-1 the apparatus equipped to handle most technical rescue incidents. New equipment is being added to the unit with federal as well as local funding. Over time, this will enable us to handle incidents that are even more complex. It will also help us to assist other communities when the need arises." stated Captain Paul Thomas company commander of Special Hazards 1 the Providence Fire Departments Heavy Rescue. (Personal communication July 16, 1999).

"The department has built a confined space training prop at our training site, and conducts annual recertification for all personnel. In addition, a yearly budget allocation of \$6,000.00 is set-aside for confined space and Haz-Mat equipment purchases. This allows us to increase our capabilities both equipment and personnel wise every year." explained Deputy Chief Robert Warren of the Cranston Fire Department in Rhode Island. (Personal communication July 16, 1999).

Deputy State Fire Marshall Mike DeMoscola stated, “The Fire Academy has both Rope Rescue Technician and Confined Space Rescue Operations Level Training Programs. The Academy was able to run four Level One Rope Rescue classes and one Confined Space Operations class this year. Federal, as well as state grant monies made it possible to run some other classes dealing with Terrorism and WMD.” (Personal communication August 16, 1999).

"Alternative funding to equip technical rescue teams, with needed equipment is one approach to use. Donations from civic groups, local industry, merchants, fundraisers, anything you can do to raise the money. Over 90% of the equipment for our heavy rescue unit was donated." stated Captain Bob Lee of the La Habra Fire Department in California. Captain Lee concluded by saying, "Funding is not always there when you need it. Be innovative." (Personal communication April 13, 1999)

Battalion Chief Bruce Jacobson of the Anaheim Fire Department in California stated, “Northnet Fire Training Academy’s Rescue Systems I and II, Confined Space, Swift Water Rescue, and Rope Rescue Technician classes are provided to the departments in the Joint Training Powers Academy as well as other departments in the Orange County area. We have provided training in the technical rescue field to fire departments nationwide.” Chief Jacobson went on to explain, “When a major technical rescue emergency occurs, most communities will require outside assistance. NorthNet has been in the forefront of developing the technical rescue training for our area.” (Personal communication April 13, 1999).

“With a little more training and a few more pieces of equipment, the NPDFD will be at the operational level. We have most of the basics covered. Compared to some other area departments we are ahead. At present, it is a funding issue; we have motivated personnel ready to train for technical rescue. By adding six to eight more to those already trained to the operations level, we could have a

dedicated team. With the purchase of a confined space rescue tripod, and supplied air respirators we could achieve operations level for confined space and rope rescue.” stated Lieutenant Frank Vescera of the North Providence Fire Department. (F. Vescera personal communication, June 7, 1999).

Lieutenant Colonel Louis A. Abbenante, a Plans, Operations and Military Support Officer for the (RING) stated “ By Federal and State law the National Guard cannot be committed until all local and state resources are exhausted. When activated, units in the state have various capabilities. Military Police units for security, engineers for debris removal, medical detachment for treatment of casualties, and aviation units for medivac. These are just a few examples of the Guard’s capabilities.” (Personal communication August 6, 1999).

Albert A. Scappaticci Operations Officer for the (RIEMA), stated “The (RIEMA) acts as an Incident Command System (ICS) providing enhanced communications. It also provides a large scale logistics grouping to provide assets for mitigating an incident.” Operations Officer Scappaticci concluded “Our job is to get what is needed to the agency mitigating the incident.” (Personal communication August 6, 1999).

According to the answers to survey question number six, although many of the departments do have personnel trained in several technical rescue disciplines, only two departments have formal rope rescue teams in place. An additional three have confined space rescue teams, two have Haz-Mat teams and one department has a dive rescue team. There are at present two confined space teams, and one Haz-Mat team in development, with an initial operational capability expected within the next 12 months. When comparing the number of actual dedicated teams, to the number of trained personnel available, it becomes evident that most personnel with technical rescue training have not been organized into formal teams. Survey data did not reveal any reason for this. The survey did indicate that some departments

are making an effort to upgrade their technical rescue training gradually through the budget process with increased funding for training. A breakdown of trained personnel in each department by operational level is shown in Appendixes D, E, and F.

This research has indicated that the equipment inventory in service in the surrounding communities provides a solid base to build on. None of the departments surveyed have all of the tools required to meet the heavy rescue designation. The list for the three levels of equipment recommended for rescue teams is located in Appendix D of the U. S. Fire Administration's *Technical Rescue Program Development Manual*, FA-159, 1995 ed.

A significant number of the surveyed departments have acquired a level of competency in the area of rope rescue. In regards to equipment, 70 percent (14 out of 20) possess the necessary gear to perform this type of rescue. The survey indicated that 15 out of 20 departments (75 percent) can perform rope rescues at the operations level. Two other areas of rescue where at least 50 percent (10 out of 20) departments can perform at the operations level are structural collapse and confined space. (See Figure 2.) This could be the building block to several regional teams with multiple capabilities. Fifteen personnel from the departments surveyed are members of the regional FEMA USAR team MATF-1 and several others have pending applications. Some team members are certified instructors in several technical rescue specialties. These resources could be tapped to provide some of the training that would enhance the capabilities of these teams.

Enlightened fire and rescue service managers realize how "special" people, "special" training, and "special" equipment work together to improve the chances of survival for rescuers and victims in technical rescue operations (rope, confined space, trench, swift water, cave, and structural collapse, among others). (Brown, 1994, p. 39).

In reviewing the equipment and personnel of the twenty mutual aid departments, one could conclude that with the exception of the Providence and Cranston Fire Departments that their capabilities are limited. These limitations have a direct negative impact on a successful mitigation of a technical rescue incident.

In summary, the research has shown that the Providence Fire Department and the Cranston Fire Department could assist the NPFDD for most types of technical rescue incidents. Pooling resources with several other surrounding departments having similar levels of training and equipment could result in enough trained personnel and equipment being available to perform a joint rescue operation. This research indicates that there are sufficient personnel trained to form several regional technical rescue teams, which could operate at both the operations and technician level in most of the technical rescue specialties identified in NFPA 1670.

RECOMMENDATIONS

Interim Measures:

- 1) Develop a mutual aid pact with surrounding communities for technical rescue needs.
- 2) Develop a rapid recall list to call back personnel certified in technical rescue.
- 3) Using available internal and external resources, institute a training program within the next three to nine months to certify additional personnel to the operations and technician level per NFPA 1670 standards.

Long term Measures:

- 4) Conduct a community based risk assessment to identify target hazards which are most likely to require technical rescue skills to mitigate incidents at their facilities.

- 5) Decide which level of capability the department needs to operate at based on the community risk assessment.
- 6) Identify personnel who are interested in training to perform technical rescue operations.
- 7) Form a Special Operations Branch, with emphasis on the following areas: Technical Rescue, Haz-Mat, and Marine Operations.
- 8) Fund training to the level needed to maintain proficiency according to nationally accepted standards.
- 9) Develop written technical rescue Operating Guidelines or Standard Operating Procedures using the *NFPA 1670 Standard on Operations and Training for Technical Rescue Incidents*.
- 10) Check for compliance with Federal and State regulatory agencies.
- 11) Look at alternative funding to finance needed equipment.
- 12) Form a regional technical rescue team with surrounding departments.
- 13) Develop contacts with area construction firms and demolition companies for heavy equipment needs.
- 14) Contract with local lumber and hardware stores for supplies that may be needed at large scale technical rescue incidents.
- 15) Communicate with area departments on a regular basis to keep abreast of new capabilities they may have developed.

Any errors, omissions or misrepresentations resulting from the interpretation of these surveys were unintentional and do not reflect any prejudice or lack of understanding on the part of the author or the respondents.

REFERENCE LIST

Brown, G. (1997). Growing Training For Growing Needs: The NorthNet Fire Training Center, *Fire Engineering*, 132.

Brown, M. (1994). Training Technical Rescue Teams: Focus On The Big Three, *Fire Engineering*, 39, 43.

DellaRocco, M. (1998). USAR Regional Response: An Exercise in Teamwork, *Fire Engineering*, 137.

Lane, J.D. (1998). *Technical Rescue Assessment of the North Providence Fire Department* (Executive Fire Officer Program). Emmitsburg, MD: National Fire Academy.

National Fire Protection Association, (1997). *NFPA 1500: Fire Department Occupational Safety and Health Program*. (1997 ed.). Quincy, MA. Author.

National Fire Protection Association, (1995). *NFPA 1600: Recommended Practice for Disaster Management*. (1995 ed.). Quincy, MA. Author.

National Fire Protection Association, (1999). *NFPA 1670: Standard on Operations and Training for Technical Rescue Incidents*. (1999 ed.). Quincy, MA: Author.

Rhode Island Association of Fire Chiefs, INC. (1999). Mutual Aid Plan. (1999 ed.) Providence, RI: Author.

Rhode Island Economic Development Corporation. (1998). State of Rhode Island Monograph (1998 ed.). Providence, RI. Author.

Rhode Island Economic Development Corporation. (1999). Town of North Providence Monograph. (1998 ed.). Providence, RI: Author.

Rhode Island General Laws Title 23, (1990). *Safety and Health Programs for Firefighters*.

(1990 ed.). Providence, RI: Author.

Rhode Island National Guard, (1999). Emergency Operation Plan, (1999 ed.). Cranston, RI: Author.

Roop, M., Wright, R., & Vines, T., (1997), Confined Space Rescue, *Fire Rescue Magazine*, 77.

Shannon, M. (1999), The Use of Cranes and Heavy Equipment in Rescue and Haz Mat, *Fire Engineering*, 152.

Town of North Providence Rhode Island, (1998). NPFD Budget Summary. (FY 1998-1999 ed.). North Providence, RI: Author.

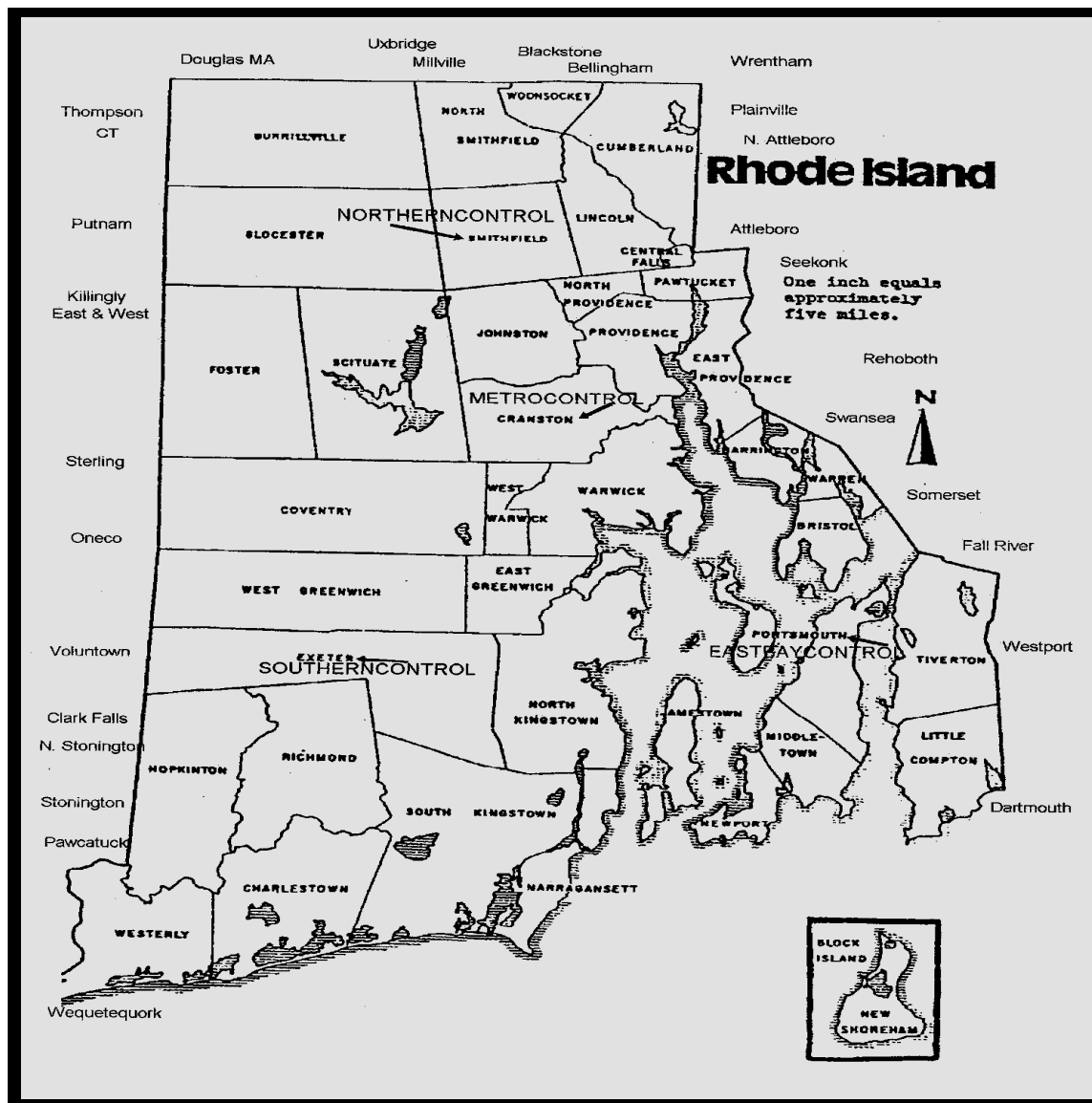
Town of North Providence Rhode Island, (1999). NPFD Budget Summary. (FY 1999-2000 ed.). North Providence, RI: Author.

United States Fire Administration, (1995). *Technical Rescue Program Development Manual*. (1995 ed.). U.S. Government Printing Office, Washington, DC: Author.

United States Fire Administration, (1995). *Technical Rescue Technology Assessment*. (1995 ed.). U.S. Government Printing Office, Washington, DC: Author.

APPENDIX A

STATE OF RHODE ISLAND MAP



APPENDIX B
COVER LETTER AND SURVEY

Battalion Chief Jack Lane Jr, NPFD
P.O. Box 114003
North Providence, Rhode Island 02911
Telephone (401) 232-7516

June 14, 1999

Dear Officer:

I am currently enrolled in the EFO program at the National Fire Academy. At this time, I am conducting a survey to gain information for a research project relating to technical rescue operations within communities across the state.

Please take a few minutes to complete the attached forms concerning your department's capabilities and equipment.

Thank you for your time. If you are interested in a copy of the results of my survey, please contact me.

Sincerely,

Jack Lane Jr.

Jack Lane Jr.

Battalion Chief

D Group

Survey of Technical Rescue Capabilities

Name of Department _____

1. Please provide the demographics of your community.

Population Served:

Under 25,000 _____

25,000 - 49,999 _____

50,000 – 74,999 _____

75,000 - 100,000 _____

Over 100,000 _____

Type of Community:

Rural _____

Suburban _____

City _____

2. What is the strength of your department? _____

Total number of Operations Personnel? _____

3. To the best of your knowledge, how many technical rescue emergencies has your department responded to in the last year? _____

4. Please indicate in the form below the number of operational personnel that have been trained for each level of response. (Note: Levels of operational capability are based on NFPA 1670, Standard on Operations and Training for Technical Rescue Incidents, 1999 Edition.)

Technical Rescue Disciplines	Operational Levels		
	Awareness	Operations	Technician
Rope Rescue/High & Low Angle			
Trench and Excavation			
Structural Collapse			
Confined Space			
Industrial Rescue			
Agricultural			
Swift Water Rescue			
Ice Rescue			
Dive Rescue			

5. What steps (if any) does your department take to ensure members are trained to perform at the highest operational level?

6. Has your department developed a technical rescue team?

Yes _____ No _____

If yes, please identify the team's rescue specialty.

7. Please indicate in the table below, the quantity of each item you have on hand and whether that item is currently in service.

Item	Quantity	In Service (Yes/No)
Air Bags		
Air Monitoring Equipment		
Air Shores		
Building Shoring Equipment		
Confined Space Rescue Tripod		
Emergency Escape Bottles		
Intrinsic Communication System		
Rope Rigging		
Special Turnout Gear		
Supplied Air Respirators		
Trench Shoring Equipment		

8. What steps (if any) does your department plan to take to acquire those items in question 7 not currently on hand?

9. In the event of a technical rescue emergency in your jurisdiction, what arrangements do you have in place to obtain advanced rescue resources and equipment?

APPENDIX C

SURVEY DEMOGRAPHICS

	COUNTS
POPULATION SERVED	
UNDER 25,000	7
25,000 - 49,999	6
50,000 - 74,999	1
75,000 - 100,000	3
OVER 100,000	3
TYPE OF COMMUNITY	
RURAL	2
SUBURBAN	8
CITY	7
GOVERNMENT FACILITY	3
DEPARTMENT STRENGTH	
UNDER 50	8
50 - 100	6
101 - 150	3
151 - 250	2
OVER 250	1
Note: Survey data includes the two state airport facilities and a naval base located in the state.	

APPENDIX D

SURVEY DATA FOR AWARENESS LEVEL TRAINING

Survey of Technical Rescue Training										
Number of Personnel at Awareness Level										
	Total Strength	Rope Rescue	Trench Rescue	Structural Collapse	Confined Space	Industrial Rescue	Agricultural Rescue	Swift Water Rescue	Ice Rescue	Dive Rescue
Barrington	21	0	0	0	0	0	0	0	0	0
Central Falls	37	5	0	5	5	0	0	1	35	1
Cranston	202	202	0	4	202	0	0	0	0	0
East Providence	110	80	100	100	100	100	100	0	0	0
Johnston	74	6	0	3	3	0	0	0	74	0
Middletown	31	6	6	6	28	29	0	6	31	21
Narragansett	34	2	0	3	32	0	0	0	0	0
Newport	98	3	3	4	84	0	0	14	0	9
North Kingstown	70	0	0	8	20	0	0	0	64	0
North Providence	98	12	12	5	12	0	0	0	0	8
Pawtucket	146	47	0	25	60	0	0	2	146	0
Portsmouth	31	0	0	0	30	0	0	0	29	29
Providence	539	64	8	491	491	0	0	0	491	16
Smithfield	43	7	0	0	0	0	0	6	6	10
Warwick	204	100	0	10	10	0	0	0	100	60
West Warwick	64	10	10	1	12	10	0	0	0	0
Woonsocket	136	128	0	0	128	0	0	2	0	2
Newport Naval*	66	55	0	55	55	55	0	0	55	0
Quonset State Airport*	44	2	0	0	24	0	0	0	0	0
TF Green State Airport*	19	0	0	0	0	0	0	0	0	0
*Government Agency										
Total Departments		20								
Departments With Trained Personnel		16	6	14	17	4	1	6	10	9
Percentage With Trained Personnel		80%	30%	70%	85%	20%	5%	30%	50%	45%
Departments With Untrained Personnel		4	14	6	3	16	19	14	10	11
Percentage With Untrained Personnel		20%	70%	30%	15%	80%	95%	70%	50%	55%

APPENDIX E

SURVEY DATA FOR OPERATIONS LEVEL TRAINING

Survey of Technical Rescue Training										
Number of Personnel at Operations Level										
	Total Strength	Rope Rescue	Trench Rescue	Structural Collapse	Confined Space	Industrial Rescue	Agricultural Rescue	Swift Water Rescue	Ice Rescue	Dive Rescue
Barrington	21	0	0	0	0	0	0	0	0	0
Central Falls	37	5	0	5	5	0	0	1	35	1
Cranston	202	16	0	0	202	0	0	0	0	0
East Providence	110	20	1	1	1	1	0	0	0	0
Johnston	74	6	0	0	0	0	0	0	0	0
Middletown	31	1	1	1	1	0	0	3	31	8
Narragansett	34	2	0	3	0	0	0	0	0	0
Newport	98	3	3	4	4	0	0	14	0	9
North Kingstown	70	0	0	0	20	0	0	0	64	0
North Providence	98	12	12	5	12	0	0	0	0	8
Pawtucket	146	47	0	0	0	0	0	0	0	0
Portsmouth	31	0	0	0	0	0	0	0	18	15
Providence	539	32	8	6	64	0	0	0	491	16
Smithfield	43	7	0	0	0	0	0	0	0	10
Warwick	204	0	0	10	10	0	0	0	100	60
West Warwick	64	10	10	1	12	10	0	0	0	0
Woonsocket	136	20	0	0	20	0	0	0	0	0
Newport Naval*	66	6	0	55	55	55	0	0	55	0
Quonset State Airport*	44	2	0	0	10	0	0	0	0	0
TF Green State Airport*	19	0	0	0	0	0	0	0	0	0
*Government Agency										
Total Departments		20								
Departments With Trained Personnel		15	6	10	13	3	-	3	7	8
Percentage With Trained Personnel		75%	30%	50%	65%	15%	0%	15%	35%	40%
Departments With Untrained Personnel		5	14	10	7	17	20	17	13	12
Percentage With Untrained Personnel		25%	70%	50%	35%	85%	100%	85%	65%	60%

APPENDIX F

SURVEY DATA FOR TECHNICIAN LEVEL TRAINING

Survey of Technical Rescue Training											
Number of Personnel at Technician Level											
	Total Strength	Rope Rescue	Trench Rescue	Structural Collapse	Confined Space	Industrial Rescue	Agricultural Rescue	Swift Water Rescue	Ice Rescue	Dive Rescue	
Barrington	21	0	0	0	0	0	0	0	0	0	0
Central Falls	37	0	0	0	0	0	0	0	1	1	
Cranston	202	0	0	0	40	0	0	0	0	0	0
East Providence	110	1	1	1	1	1	0	0	0	0	0
Johnston	74	0	0	0	0	0	0	0	0	0	0
Middletown	31	1	1	1	1	0	0	3	0	8	
Narragansett	34	2	0	0	0	0	0	0	0	0	0
Newport	98	3	3	4	4	0	0	14	0	9	
North Kingstown	70	0	0	0	0	0	0	0	64	0	
North Providence	98	12	12	5	12	0	0	0	0	8	
Pawtucket	146	3	0	0	0	0	0	0	0	0	0
Portsmouth	31	0	0	0	0	0	0	0	12	15	
Providence	539	8	8	0	16	0	0	0	0	8	
Smithfield	43	0	0	0	0	0	0	0	0	0	0
Warwick	204	0	0	10	10	0	0	0	100	60	
West Warwick	64	2	1	1	12	10	0	0	0	0	0
Woonsocket	136	20	0	0	20	0	0	0	0	0	0
Newport Naval*	66	3	0	3	2	0	0	0	0	0	0
Quonset State Airport*	44	2	0	0	2	0	0	0	0	0	0
TF Green State Airport*	19	0	0	0	0	0	0	0	0	0	0
*Government Agency											
Total Departments	20										
Departments With Trained Personnel	11	6	7	11	2	-	2	4	7		
Percentage With Trained Personnel	55%	30%	35%	55%	10%	0%	10%	20%	35%		
Departments With Untrained Personnel	9	14	13	9	18	20	18	16	13		
Percentage With Untrained Personnel	45%	70%	65%	45%	90%	100%	90%	80%	65%		